

## INDIAN DRAGONFLIES.

BY

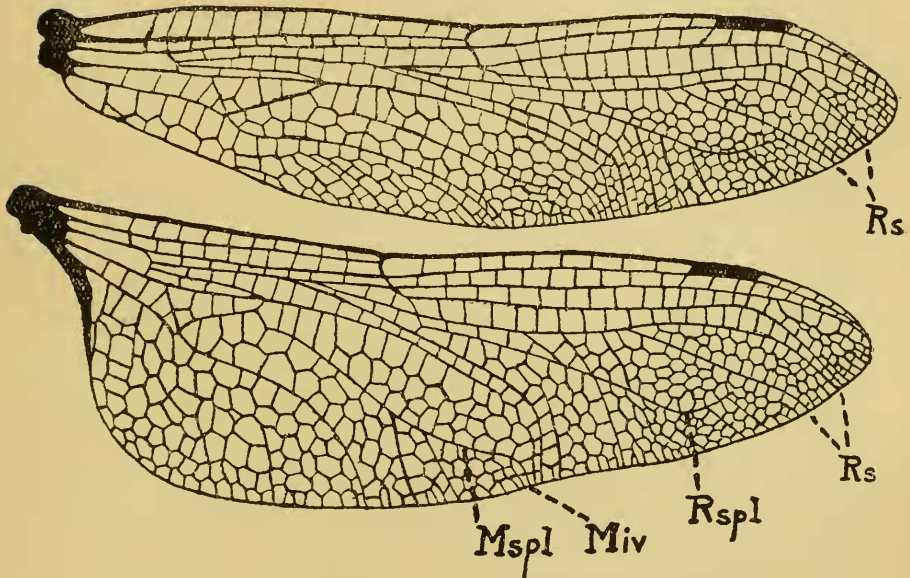
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(With 3 Text-figures).

(Continued from page 122 of this Volume).

## PART XII.

Genus—ANACIÆSCHNA.

Fig. 1. Wings of *Anaciæschna jaspidea* (x 2.6).

**Anaciæschna**, Selys, Mitth Mus. Dresd. iii. p. 317 (1878); Bull. Acad. Belg. (3) v.p. 729 (1883); Laidlaw, Rec. Ind. Mus. Vol. xxii, p. 87 (1921); Martin, Cat. Coll. Selys, p. 30, fig. 25 (1909), *Aeschnines*, xix, xx.

Head large, eyes globular and broadly contiguous; occipital triangle very small.

Wings broad, apices a little rounded, reticulation moderately close or close, trigones elongated, of 4 to 6 cells, cubital space and hypertrigones with many transverse nervures, median space entire, *Rs* (5th nervure) bifurcated just below the inner end of stigma which latter is long, narrow and well braced, nodal sector (4th nervure) making an abrupt curve towards the costa at the outer end of stigma, this curve well marked in *jaspidea* less so in *donaldi*, 3 to 4 rows of

cells between *Rs* and *Rspl*, membrane large and prolonged nearly as far as the anal angle, base of hindwing in the male excavated slightly but nearly straight, anal triangle of 3 cells.

Abdomen long and cylindrical, oreillets small, triangular, their posterior margin dentate; 10th abdominal segment with a small, median, dorsal tubercle, only vestiges of lateral abdominal ridges on segments 4 to 7.

Anal superior appendages long and lanceolate, the inferior subtriangular. Border of 10th abdominal segment in the female subrotundate and subdenticulate beneath; anal appendages in the same sex lanceolate and foliate.

Only two species of this genus are known, of which the male of one is unknown. *Anaciæschna jaspidea* is the type of the genus and *Anaciæschna donaldi* of which only the female has so far been discovered differs from it only by the reticulation being more close and the nodal sector making only a slight but noticeable curve towards the stigma. Until the male is found, this species can only be placed provisionally in the genus.

*Anaciæschna* bears a close relationship to *Anax*, the shape of the base of the hindwing and the curve of the nodal sector beneath the stigma approach that of *Anax* whilst the partial obliteration of the lateral, longitudinal ridges on segments 4 to 8 bring it into near relationship with *Hemianax*. The presence of oreillets on the sides of segment 2 and the forking of *Rs* however connect it more closely with *Aeschna*. The genus must be regarded as the connecting link between two large groups.

***Anaciæschna donaldi*, sp. nov.**

Female only known. Abdomen 53 mm. Hindwing 47 mm.

1 female, Kodaikanal, 6,800' May 1908, (teneral), 1 female from same locality, September 1921, and two others in October 1921, coll. T. B. Fletcher, 1 female, Yercaud, coll. T. N. Harsey, September 1921, several females seen and taken, Ootacamund, September 1921.

Head. Eyes dark olivaceous brown. the posterior border finely above, more broadly below apple green; labium and labrum brown, face and frons olivaceous with shadings of blue; above the frons greenish-yellow marked with a broad, dark brown "T."

Prothorax dark brown coated with a faint, bluish bloom; posterior lobe simple, rounded and fringed with long hairs.

Thorax rich maroon brown especially on the front of dorsum, marked with brilliant apple green as follows:—2 linear, transverse spots on the interalar sinus, a hook-shaped mark and a small spot on the tergum at the base of the forewings and 2 similar spots at the base of the hindwings. On the sides a moderately broad stripe between the two lateral sutures and an isolated, triangular spot at its upper end and a broad stripe occupying the posterior half or two thirds of the metepimeron.

Legs entirely black. Posterior femora with a row of very closely set, very minute spines.

Wings saffronated throughout, very deeply so in the teneral specimen from Kodaikanal. At the bases of both wings is a deep, diffuse smoky brown marking not quite reaching the costa in front and limited posteriorly by the anal vein but extending into 3 cells of the anal triangle. Outwardly this mark extends to rather beyond the arc.

Stigma yellowish brown; membrane black, white at the base. Nodal index:— $\frac{8-19}{11-12}$   $\frac{19-10}{14-12}$ ; trigones traversed 4 times in the forewing, 3 in the hind, in all, the proximal nerve is joined to the base of the trigone by a connecting nerve; 8 to 9 cells in the loop; *Rs* forked about one cell proximal to the inner end of the stigma in the forewing, 3 cells in the hind; 3

rows of cells between *Rs* and *Rspl*, 7 cubital nervures in the forewing, 5 in the hind.

Abdomen tumid at the base and gradually tapering to the end. Dark blackish brown marked on the first 3 segments with bright apple green and on 4 to 7 obscurely at the sides with pale yellowish brown. In teneral specimens these spots are pale yellow. Segment 1 has an apical, triangular green mark, segment 2 a small round, dorsal spot on the basal half of the mid-dorsum, a larger, triangular, dorsal spot on the apical half and the sides very broadly apple green, segment 3 has the sides broadly at the base of the same colour, this tapering gradually to the extreme apex.

Anal appendages short and lanceolate. Dentigerous plate closely similar to that of *Anax*, coated with minute denticles.

*Hab.* Breeding in still water in the lakes at Kodaikanal, Ootacamund, Lovedale and Yercaud. I have provisionally placed this species in genus *Anaciæschna* for reasons mentioned above. No less than 10 females have been seen, all ovipositing by Messrs. Bainbrigge-Fletcher, Hearsey and myself, but none of these were accompanied by the male. Mr. H. V. O'Donel states that *Anaciæschna jaspidea* in Bengal is a night-flyer but neither Mr. Fletcher nor I have detected *donaldi* flying at dusk and indeed the nights are too cold as a rule for these insects to be on the wing. Personally I have searched neighbouring jungles during the day and attempted to beat up the males but without any success. Mr. Bainbrigge-Fletcher and myself have found a very fair number of exuvia clinging to sedges alongside the respective lakes mentioned so that the insect cannot be scarce. The females not uncommonly prefer to oviposit at the outlet of lakes and Mr. Fletcher suggests that the larvæ prefer slow running water to one that is entirely stagnant, but Mr. Hearsey and myself have seen them ovipositing in tanks without any outlet. I watched one particular female for half an hour inserting its eggs into the broad leaves of water lilies well inside the cup formed by the curled up edge of the leaf, but usually they descend into the water until almost up to the thorax.

The larvæ when young are very black and keep to grassy shallows on the edge of the tanks and are not difficult to obtain. The full grown larva judged by the exuvium is considerably smaller than that of *A. immaculifrons* measuring only 35 to 38 mm. The sides of the 6th to 9th segments end in robust spines. The mask which is very similar to that of *A. immaculifrons* extends to the bases of the middle pair of legs. Specimens sent to me from Kodaikanal by Mr. Bainbrigge-Fletcher are pigmented black and very clean, whilst those from the Lovedale lake are rust-red due to a protococcus which colours the floor of the lake a similar colour and must serve admirably for purposes of concealment.

***Anaciæschna jaspidea***, Burm. Handbk. Ent., ii. p. 840. n. 16 (1839); *Æschna jaspidea*. Burm., Handbk. Ent., ii., p. 840. n. 16 (1839); *Anax jaspidea*, Brauer, Reise, d. Novara, Neur. p. 63 (1866); *Anax jaspideus*, Hagen, Verh. Zool. bot. Ges. Wien, xvii, p. 32 (1867); *Æschna tahitensis*, Brauer, Verh. Zool. bot. Ges. Wien, xv. p. 907 (1865); Reise, d. Novara, Neur. p. 73 (1866), Hagen. l. c. p. 48 (1867); *Anaciæschna jaspidea*, Selys, l. c.

Male. Abdomen 47 mm. Hindwing 42 to 46 mm.

Head large and globular; face narrow, yellow; frons of the same colour but the crest marked with a moderately broad, brown line; occiput yellow. Labium and labrum ochreous.

Prothorax bright yellow, especially the posterior lobe which is very large and rounded.

Thorax pale reddish brown, the dorsum ochreous and the sides marked with 2 broad, greenish yellow stripes, the first rather nearer the humeral suture than the lateral, the second covering practically the whole of the metepimeron. There

is also a vestigial, humeral line represented by a small, triangular spot at the upper part of the humeral area.

Abdomen tumid at the base, the 3rd slightly constricted and thereafter cylindrical and parallel sided as far as the anal end. Ground colour ochreous brown marked with yellow as follows:—The sides of segments 1 to 3 with a moderately broad, lateral stripe not reaching below, a basal spot of yellow on segment 1. Segments separated by black annules, segments 4 to 8 with lateral whitish blue stripes not extending as far as the apex of the segments, lessening in size on segments 6 and 7. Segments 6 to 10 have apical, subdorsal spots of the same colour which increase rapidly in size on the latter 3 segments. The dorsum of these 3 segments is a much darker brown than the preceding.

Legs black, the trochanters, coxæ and proximal part of the femora reddish brown.

Anal appendages dark brown, the superior razor shaped, the basal fifths narrow, the apical three fifths strongly ribbed on the dorsal surface in its length, this rib ending at the apex in a robust sharp hook.

The blade portion of the appendage is coated with long, inwardly directed hairs. Inferior appendage triangular, four fifths the length of the superior, turning up at its end.

Wings hyaline, the subcostal space in the forewing as far as the node and the cubital space for about halfway to the trigone palely saffronated. The hindwing similarly so as well as the anal triangle and a large area extending across the wing from the trigone to the stigma. Stigma yellow or brownish yellow, membrane grey, white at the base; nodal index:—

$$\frac{8-16}{11-9} \frac{16-9}{10-11}, 4 \text{ to } 5 \text{ cubital}$$

nerves in the forewing, 3 to 4 in the hind, trigone in the forewing traversed 3 to 4 times, 3 times in the hind, the proximal nerve in the trigone of the forewing never connected to the base of the trigone by another nerve as in *donaldi*, always so in the hind, reticulation closer than in *donaldi*.

Female closely similar to the male, the ground colour being a paler brown. The abdomen more tumid at the base, not constricted at the 3rd segment but tapering gradually to the anal end. The colouring on the sides of segments 1 and 2 spreads on to the dorsum. The spots on the other segments are rather broader than in the male and segment 10 is entirely yellow.

Anal appendages lanceolate, shorter than those of the male.

Dentigerous plate resembles closely that of *Anax*, the hinder border being subrounded and its surface coated thickly with minute denticles.

*Hab.* Mr. H. V. O'Donoghue informs me that in the Duars this species is a night flyer. Before dusk it flies high but as night falls it descends to lower levels and is seen skimming near the ground. Occasionally it comes to light.

The species appears to have a wide range, being recorded from Bengal, Upper Burma, Java, Sumatra, Lombok, Borneo, Formosa and Tahiti.

#### Group—ÆSCHNA.

Under this heading I have grouped a number of genera which differ rather widely in characters but all agree in having *Rs* (5th nerve) symmetrically forked and *Rspl* (5a) and *Mspl* (7a) strongly concave towards *Rs* and *M4* (7th nerve) respectively so that the two nerves enclose 3 to 6 rows of cells.

Correctly speaking *Anacischna* should be included in this group but on account of its intermediate characters I have preferred to assign it a position where it links up the two groups *Anax* and *Aeschna*.

The eyes are large, more or less contiguous but usually less so than in *Anax*; frons moderately broad, occiput usually small and simple; wings long and broad, reticulation close, base of hindwing angulated or excavate in the male; dentigerous plate of female and anal appendages of the male markedly specialized.



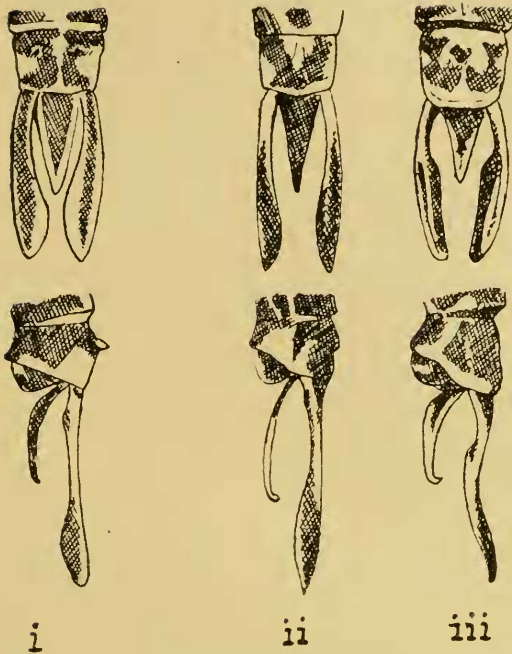
Genus—*ÆSCHNA*, Fabr.

Fig. 2. Anal appendages of (i) *Aeschna juncea*, (ii) *Aeschna mixta*, (iii) *Cephalæschna masoni*.

***Aeschna***, Fabr., Syst. Ent., p. 424 (1775); Leach., Edinb. Encycl., ix, p. 137 (1815); Steph., Ill. Brit. Ent. Mand., vi, p. 82 (1836); Ill. Mag. p. 126 (802); Selys, Mon. Lib. Eur., p. 98 (1840); Rev. Odon., p. 112 (1859); Bull. Acad. Belg., (3) v. p. 728 (1883); Ramb., Ins. Nevr., p. 192 (1842); Kirby, Cat. Odon., p. 86 1890); Laidlaw, Rec. Ind. Mus., Vol. xxii, p. 75 (1921).

Eyes moderately contiguous; frons moderately rounded as seen from above; occiput small or mediocre; wings moderately broad and long, reticulation close or moderately close; trigones elongate, of 3 to 5 cells; subtrigones entire or of 2 cells, cubital space and hypertrigones traversed several times, the latter rarely free. 5th nervure (*Rs*) bifurcated after the level of or before the inner end of stigma; stigma short or long; arcular (basal) space entire; membrane variable; anal border of hindwing in the male excavated; anal triangle long and narrow, divided into 2 or 3 cells. Abdomen subcylindrical, generally tumid at the base and constricted at the 3rd segment; anal appendages large or mediocre, sublanceolate, the inferior long and narrow, subtriangular or a little truncate at the end.

Female with the 10th abdominal segment subrounded below (the denticerous plate) subdenticulate or spined. Anal appendages variable.

*Hab.* Cosmopolitan. Type of genus, *Aeschna juncea*, Linn.

***Aeschna mixta***, Latr, Hist. Nat. Crust. Ins., xiii, 7, (1805); Charp. Hor. Ent., 35 (1825); Charp., Lib. Eur., 110 t. 19 (1840); Selys, Mon. Lib. Eur., 102, (1840); id. Rev. Odon., p. 122 (1850); McLach. Cat. Brit.

Neur., 15 (1870); Kirby, Syn. Cat. Neur. Odon., 88 (1890); Bath, Handbook Brit. Drag. p. (1890); Lucas, Brit. Drag. p. 177 (1900)  
 Martin, Cat. Coll. Selys, *Æsch.* xix-xx. p. (1909); Laid., l. c. p. 88  
*Æschna mixta*, Hagen, Ent. Ann., 52 (1857).  
*Libellula coluberculatus*, Harris, Expos. Eng. Ins. 91, t. 27 f. i. (1782).  
*Æschna coluberculæ*, Kirby, Cat. Odon., (1890).  
*Æschna affinis*, Steph., Illus. Brit. Ent. Mand., vi., 85 (1830); Evans, Brit Lib., 22 t. 12 f. 2 (1845).

*Æschna alpina*, Selys, Rev. Odon., 125 (1850), id Rev. Zool., (1848) p. 16.

Male. Abdomen 45 mm. Hindwing 38 mm.

The name "*coluberculatus*" has priority of claim but as there is considerable doubt as to whether Harris description was intended for "*mixta*" or "*juncea*" it seems better to adhere to "*mixta*," a name which has come into general usage.

Head: Labium ochreous; labrum greenish yellow surrounded with a border of black; epistome and frons greenish yellow, the upper surface of the latter marked with a black "T" mark. In front of the eyes is a black line confluent with the stalk of the "T"; vesicle and occiput yellow; eyes broadly contiguous, deep blue in the living state.

Prothorax dark brown, yellowish at the sides.

Thorax brown marked in front with a vestigial spot of yellow on each side, the rudiment of an antehumeral stripe and on the sides by two broad, oblique stripes of bright yellow. The tergum spotted with yellow at the bases of the wings and in the middle line.

Legs robust, black.

Wings hyaline, costa brown, neuration black; stigma dark brown, 3.5 mm. in length; membrane white bordered with greyish, of moderate size.

Abdomen tumid at the base, constricted at the 3rd segment and then of uniform width and cylindrical to the end, dark brown spotted with blue and yellow as follows:—1st segment brown on the dorsum, yellow on the sides, 2nd segment with a narrow triangular, bright yellow mark on the basal half of the dorsum, 2 narrow, linear, transverse streaks at the middle, separated by but not confluent with the first marking, apical half of the segment blue changing to yellow on the sides, 3rd to 8th segments with 2 transverse streaks of blue about the middle of segments separated by the dorsal carina, on the sides an elongate spot of blue extending from the base for about two thirds the length of the segments, apically large, dorsal, subtriangular spots of blue.

On segment 8 the lateral spot is very small, segment 9 has the apical spot but not the other two, segment 10 has a lateral, squarish spot of yellow.

Anal superior appendages dark brown, flattened, sublanceolate, curled corkscrew fashion, pointed at the end, coated with long hairs at the apical half. Inferior pale yellowish brown, narrow, curling strongly up at the end, about four-fifths the length of the superior.

Female somewhat similar to the male, differing as follows:—

Abdomen 48 mm. Hindwing 38 mm.

Labium, labrum and face brownish yellow; eyes greenish instead of blue. Wings rounded at the anal angle. Abdomen more tumid at the base, not constricted at the 3rd segment. 2nd segment without the blue on dorsum and the spots on other segments greenish yellow instead of blue.

Anal appendages long, lanceolate, blunt at the end, without the hairy coating except for the marginal fringe. Dentigerous plate short, its posterior border quite straight, coated with minute, black denticles.

Nodal index:— $\frac{9-15}{10-9} \mid \frac{15-8}{9-10} \mid \frac{9-15}{9-9} \mid \frac{14-8}{9-9}$  trigones rather short, 4 cells in all, 4 to 5 cubital nervures in both wings, 8 cells in the loop, hypertrigones traversed once or twice in both wings.

*Hab.* Kashmir only, within Indian limits but elsewhere extending across Europe and the British Isles. I have only seen British specimens of this species but they do not differ in any way from that recorded from Kashmir. The species has also been reported from North Africa.

*Æschna juncea*, Linn., Syst. Nat., i., 544, n. 10 (1758).

*Æschna juncea*, Steph., Illus. Brit. Ent. Mand., vi., 84 (1835); Evans, Brit. Lib., 21, p. ii. f. 2 (1845.)

*Æschna juncea*, Selys, Mon. Lib. Eur., 106 (1840); id. Rev. Odon., 116 (1850); Hagen, Neur. N. Amer., 120 (1861); McLach., Cat. Brit. Neur., 15 (1870); Kirby, Syn. Cat. Odon., p. 87 (1890); Lucas, Brit. Drag. p. 189 (1900); Bath, Handb. Brit. Drag. p. (1890); Martin, Cat. Coll. Selys., *Æsch.* xix, xx (1909).

*Æschna juncea*, Hagen, Ent. Ann., 53 (1857).

*Libellula quadrifasciata*, var. *E. ocellata*, Mull., Nov. Aet. Leop.-Carol 61 (1764).

*Libellula ocellata*, Mull., Nov. Act. Acad. Leop.-Carol., iii., p. 125 (1767)

*Æschna ocellata*, Hagen., Syn. Lib. Eur., 54 (1840).

*Æschna rustica*, Zett., Ins. Lapp., 1040 (1840).

*Æschna picta*, Charp., Lib. Eur., 112, t. 20 (1840).

*Æschna caucasiaca*, Selys, Rev. Odon., 300 (1850).

*Æschna propinqua*, Seudd., Proc. Bost. Soc. N. H., x., 215, (1866).

Male. Abdomen 55 mm. Hindwing 45 mm.

Head. Labium orange, sometimes bordered with dark brown, labrum yellow, bordered finely at the base and free border with brown; lower epistome and frons bright yellow, the suture between them marked out in black; upper surface of frons bearing a black "T" shaped mark which spreads forwards over the crest; vesicle bright yellow; occiput yellow; eyes deep sea blue.

Prothorax brown with a yellow posterior lobe.

Thorax dark brown marked with 2 narrow, antehumeral bright yellow stripes and 2 moderately narrow, greenish yellow stripes on the sides both bordered narrowly with black; attachments of wings spotted with yellow; tergum spotted with blue,

Legs black, bases of anterior pair of femora yellow.

Wings hyaline, occasionally faintly enfumed; costa bright yellow, reticulation black; stigma narrow, about 4.2 mm. in length, yellowish brown; membrane short and broad, nearly quadrilateral, not extending as far as the nervure which traverses the anal triangle transversely, its base white, otherwise ashy; anal triangle with only 2 cells; Nodal index:  $\frac{12-19}{14-12} \mid \frac{18-11}{13-13}$ , trigones in the forewing traversed 3 times, twice in the hindwing, the basal nervure in each case connected to the base by a transverse nervure; 10 to 13 cells in the loop; cubital nervures in the forewing 6, in the hind 5; hypertrigones traversed 3 to 4 times in the forewing, twice in the hind; 3 rows of cells between the bifurcation of *Rs* (5th nervure) and 4 to 5 between *Rs* and *Rspl* (5th and 5a nervures).

Abdomen tumid at the base constricted at the 3rd and thereafter cylindrical and of even width to the end, blackish brown marked with yellow and blue as follows:—1st segment with a transverse subbasal streak of blue and a lateral, streak of yellow on the sides, 2nd segment with a bright yellow and a linear transverse streak of the same colour on either side of it, apically a large spot of blue on either side separated by the dorsal carina and connected with a bluish and yellow spot lower down on the side, 3rd to 8th segments with fine, linear transverse, yellow, dorsal streaks situated slightly nearer the base than the apex large, apical subdorsal, subtriangular, blue spots and 3 lateral spots of yellow or greenish blue; on the 3rd segment the basal one of the latter 3 spots is very

large and clear blue in colour, on the 8th segment, the apical spot is usually absent and the 9th and 10th segments have only the blue, apical, subdorsal spots.

Anal appendages dark brown, sublanceolate, strongly ribbed, pointed at the end. The inferior appendages are about three-fourths the length of the superior and narrowly triangular.

Female very similar to the male, differing as follows:—eyes an emerald green; abdomen very tumid at the base and not constricted at the 3rd segment; the spots on the abdomen which are blue in the male are apple green in the female. Anal superior appendages shorter, lanceolate. Dentigerous plate similar to that of *A. mixta*.

*Hab.* I record this as within Indian limits on the strength of a single male specimen in the British Museum labelled from Kashmir. I see no reason why this should not be correct as outside Indian limits *A. juncea* is found throughout Central and Northern Europe and it may very naturally spread throughout Central Asia and Siberia.

The species closely resembles *A. mixta* from which it may be distinguished by the shape and size of the membrane. In *mixta* it extends along the base of the wing to beyond the transverse nervure of the anal triangle, whilst in *juncea* it stops well short of this nervure. The anal triangle in *mixta* has 3 cells, and only 2 in *juncea*.

*Æschna ornithocephala*, MacLach., Ann. Mag. Nat. Hist., (6), xvii, p. 368 (1896); Martin, Cat. Coll. Selys, *Æsch.*, p. 63, fig. 59; Laid., Rec. Ind. Mus., Vol. xxii., p. 88 (1921).

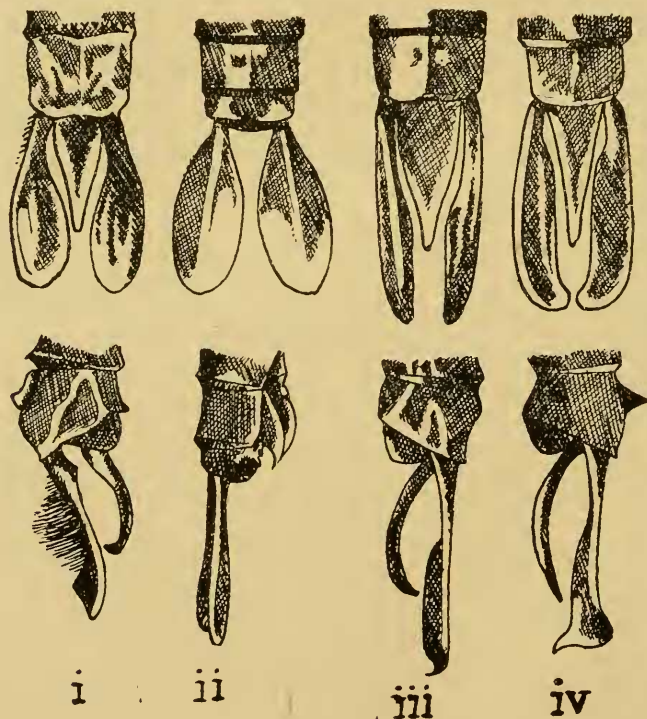


Fig. 3. Anal appendages of (i). *Æschna erythromelas*, (ii). *Æschna petalura*. (iii). *Anaciaeschna jaspidea*, (iv). *Æschna ornithocephala*.



Male. Abdomen 56 mm. Hindwing 46.5 mm.

Head. Eyes olivaceous green, very broadly contiguous; occiput very small, black; vesicle black; labium bright ochreous; labrum bright green bordered with bright ochreous; face and frons bright green, the latter deep brownish black above.

Prothorax brown.

Thorax maroon brown marked with sage green as follows:—narrow, antehumeral bands, moderately broad posthumeral bands and the whole of the metepimeron.

Wings hyaline, but slightly enfumed throughout; nodal index:— 14-17 18-12

13-12 11-14

trigone in forewing made up of 3 cells, in the hind 2; cubital nervures in the forewing 5, 3 in the hind; anal triangle with 3 cells, the loop with 5; *Rs.* (5th nervure) bifurcates at the outer end of the stigma and encloses a double row of cells; stigma rather small, 2.5 mm. brownish black; membrane ashy white with a streak of brown at its attached border.

Legs reddish brown, the middle and hind femora with a row of small, very closely set spines, tarsal spines long and numerous, claw hooks robust, situated about the middle of the claws.

Abdomen a little tumid at the base, only very slightly constricted at the 3rd segment. Oreillets moderately large. General colouring blackish brown marked as follows:—a broad band of sage green extending along the sides of the 1st, 2nd and basal fourth of the 3rd segment, an apical, transverse stripe of green on the 1st segment, a dorsal stripe of the same colour on the 2nd somewhat constricted at its middle, apical green annules on the 3rd to 8th segments and dorsal green triangles on the 3rd to 7th. Segments 9 and 10 are unmarked.

Superior anal appendages of curious shape, petiolated at the base and broadening rapidly afterward, the end somewhat quadrate and furnished with a robust spine which is directed inward and backward. This portion has been compared to the head and beak of a bird from which the insect derives its name. Brownish black, furnished with rather long hairs. The inferior appendage about three-fourths the length of the superior, triangular, curving strongly throughout its length. The dorsum of the 10th segment is furnished with a robust spine.

Females differing rather widely from the male, and of much more robust build. The markings on the thorax and abdomen are similar but the dorsal markings of the abdomen are yellow instead of green, the lateral markings being green only as in the male.

Abdomen 52 mm. Hindwing 51 mm. The ratio of the wing and abdominal lengths is nearly the same here, whereas in the male there is a difference of 10 mm.

Face and frons olivaceous green with a tinge of ochreous; eyes deep brown. Ground colour of the abdomen a rich reddish brown; legs black, the bases of femora reddish.

Wings very broad, the tornus rounded. Hyaline but the area extending from a little proximal of the node to the distal end of the stigma a moderately deep smoky brown. stigma nearly black; membrane white. Loop with 7  
14-2 119-17  
to 8 cells; hindwing has 4 cells in the trigone; nodal index:— ————, 17-14 13-14

6 and 4 cubital cells in the fore and hindwings respectively, other features as for the male.

Dentigerous plate rounded, flattened and deflected posteriorly, the ovipositor passing through it. Its border, furnished with a few scanty spines and its inferior surface with smaller spines.

Anal appendages short, narrow and lanceolate.

*Hab.* This and the following species, as well as the whole of the species of *Gynacantha* are alike in possessing the curious habit of ovipositing in dry earth. Dr. Laidlaw quotes an interesting note made by Dr. Annandale on a number of females which he observed ovipositing in dry, earthy banks about one to two feet above water level. Five or six eggs were deposited with great rapidity in each spot. The anal appendages in this species are very short and so are not liable to damage whilst performing this operation as they are invariably so, in the *Gynacantha*. The dentigerous plate is employed by the insect to obtain a purchase for the end of its abdomen whilst drilling the hole for each egg, the spines preventing any slipping.

I am indebted to Mr. H. Stevens for examples of this interesting and fine insect. Darjiling District and Northern Assam are the districts to which this insect is restricted.

***Æschna erythromelas***, MacLachlan, Ann. Mag. Nat. Hist., (6), xvii., p. 419 (1896), Martin, Cat. Coll. Selys, *Æschnines*, p. 62, fig. 58. Laidlaw, Rec. Ind. Mus., Vol. 88, p. 88, (1921).

Male. Abdomen 68 mm. Hindwing 53 mm.

Female. Abdomen 60 mm. Hindwing 57 mm.

Male.

Head. Labium, labrum and epistome brown; frons olivaceous with a broad, ill-defined, black, T-like mark on its upper surface and slightly overlapping its anterior surface; eyes brown but probably greenish during life, broadly contiguous; occiput small, black.

Prothorax and thorax dark brown, the latter with a green, antehumeral band on each side and two very broad, similarly coloured bands at the sides.

Legs black, the femora with reddish spines.

Wings hyaline, the costa black; stigma very small, black; membrane white; anal triangle with 3 to 4 cells; *Rs* (5th or subnodal sector) forked at the level of the inner end of the stigma and enclosing 5 to 6 rows of cells between it and *Rspl* (*5a*), trigones with 5 to 6 cells in the forewing, 5 in the hind; 4 to 5 nervures in the hypertrigone of forewing, 4 in the hind; nodal

17-24 26-17

index; ——— ———; 11 cells in the loop.

18-17 16-19

i. Terminal segments of abdomen of *Æschna erythromelas* showing (*a*) dentigerous plate.

ii. The same of *Æschna ornithocephala*.

Abdomen very long and cylindrical, the base tumid, tapering rapidly from the 3rd segment, oreillets small but prominent, lobes of the sexual organs on the 3rd segment prominent, quadrate. Colour reddish brown marked with yellow as follows:—

segment 1 has a fine, lateral, apical streak, segment 2 has 2 median spots, a fine yellow annule and the sides rather broadly yellow, segment 3 has a continuation of the yellow on the sides, two median spots and an apical annule, segments 4 to 7 have the same median spots and apical ring, segments 8 to 10 are unmarked. The latter segment has a blunt tubercle or low ridge on its dorsum and its dorsal carina is pronounced.

Superior anal appendages black, seen from above they are spatulate and very broad, seen in profile they are strongly curved especially at the ends. At the base and beneath there is a robust tubercle and on the upper surface of the apex, a small tubercle. The apical two thirds is thickly coated with long hairs on its upper surface. The superior appendages equal in length to the last two abdominal segments, the inferior rather more than half the length of the superior, curving up strongly to meet the superior, its end furnished with a small, recurved hook.

Female.

Very similar to the male but much more robust, the wings broader, the abdomen stouter and shorter relatively. The thorax reddish brown with the same markings as for the male, the abdomen a rich ochreous or reddish orange. The 1st segment on the dorsum and the base of the 2nd marked with green, all other segments unmarked. The 8th, 9th and 10th segments are mostly black, the ground colour exhibited only as spots of reddish.

Legs back, red at the base.

Anal appendages small, leaf-like pointed at the apex, black, a little longer than the 10th segment and separated by a hairy protuberance.

The dentigerous plate prolonged into an acute arch through which the ovipositor passes. Its free border below furnished with about 10 robust spines, its surface free of spines.

*Æschna petalura*, Martin, Cat. Coll. Selys, *Æschnines*, pp. 78-79, 1909.

Laid. Rec. Ind. Mus., Vol. xxii., p. 89, 1921.

Male. Abdomen 63 mm. Hindwing 53 mm.

Head. Face and frons yellow, the latter with a badly defined, black T-shaped mark above on a brownish background; eyes large, broadly contiguous; occiput small black.

Thorax blackish, marked with a yellow, antehumeral line on each side of the dorsum and two very broad, yellow bands on each side. Legs black.

Wings hyaline; stigma black, very small; trigone with 6 cells; hypertrigones traversed 5 times; forewing with 25 antenodal nervures and 15 postnodals; membrane yellowish white; anal triangle with 3 cells; *Rs* (5th or nodal sector) bifurcating at the level of the inner end of stigma.

Abdomen cylindrical, slender, slightly tumid at the base and slightly constricted at the 3rd segment. Dark brown marked with pale spots but slightly apparent. The sides of the 2nd segment pale yellow and apical rings on segments 3 to 6. The 10th segment with a slightly elevated tubercle on the dorsum.

Anal superior appendages black, very hairy, petiolated in the basal fourth, then broadening into a spatulate foliation, rounded at the apex. Inferior rather more than half the length of the superior.

Female. Very similar to the male. Occipital triangle yellow.

Thorax dark brown marked with a green antehumeral line on each side of the dorsum and two broad yellow stripes on the sides.

Abdomen much stouter than that of the male, tumid at the base and cylindrical thereafter to the anal end, dark brown on the dorsum, paler low down on the sides. Marked with pale brown or yellow spots as follows:—1st segment yellow on the dorsum, 2nd segment with a basal, dorsal triangle, 2 transverse stripes about the centre of the dorsum separated by the dorsal crest and finally an apical ring of yellow broken by the dorsal crest, segments 3 to 7 with the same dorsal stripes in the middle of the segment and the apical ring, segments 4 to 7 have additional dorsal points of yellow, 8 has only the apical annule which is broadly broken by the dorsal crest, 9 has some yellow on the lower part of the sides and 10 is unmarked.

Anal appendages similar to the male but larger and broader.

Wings saliated; stigma brown, very small; trigone of forewing with 5 cells, 4

in that of the hind; *Rs* bifurcated a little before the origin of the stigma; membrane large, yellowish white; hypertrigones traversed 3 times; nodal index:—

12-19 | 20-14

—————, reticulation open.

16-14 | 16-18

*Hab.* Darjiling District and Khasia Hills. I have not seen a specimen of this insect which must be very rare or local. Concerning it Dr. Laidlaw states that it is scarcely a true *Aeschna* giving as reasons the difference between the trigones in the fore and hindwings and also the few rows of cells (3 rows only) between *Rs* and *Rspl* (5th nervure and 5a).

*Aeschna annulata*, Fabr. Ent. Sys. supp. (1798).

The type of this species has been lost and it is doubtful as to which species Fabricius referred. His description is meagre:—size median, head obscurely yellow, thorax brown and hairy, abdomen cylindrical, pale yellow with the margins of segments black. Legs yellow.

*Hab.* India.

*Aeschna*, sp. nov. B. M. No. 98/242, Sikkim, 2,000', June 1895, coll. J. G. Pilcher.

I have seen a single female of a species of *Aeschna* in the British Museum indicated from Sikkim which does not belong to any described species. The altitude given is obviously wrong.

The following is a description of the insect but I regret that at the time of examining it I failed to note the character of the dentigerous plate.

Female. Head—Face and labrum bright yellowish green variegated with lines of bright ochreous; labium yellow with a spot of greenish in the middle; frons with a broad, black crest; occiput simple, brown bordered with dirty yellow.

Thorax brown or it may have been dark green during life, marked with 3 fine, black lines on the humeral and lateral sutures, the middle line being incomplete in its upper half. The front of thorax marked with dark green antehumeral bands.

Abdomen dark brown marked with blue, this latter has a large apical, dorsal spot on each segment from 3 to 7 on each side of the dorsal carina which barely separates the two. The remainder of the abdomen is unmarked, probably the spots having faded from decomposition.

Anal appendages short, lanceolate, brown.

Wings hyaline but a little enfumed and saliated; stigma reddish brown, 3.5 mm.; membrane ashy white at the base, pale brown along the lower border; trigone with 6 cells in the forewing, 5 in the hind; all hypertrigones traversed

15-23 | 24-18

4 times; nodal index:— —————; loop with 10-17 cells; 7 to 8 cubital

19-16 | 17-19

nervures.

(To be continued.)